BTEC Assignment Brief

Qualification	Pearson BTEC International Level 3 Diploma in Construction and the Built Environment Pearson BTEC International Level 3 Extended Diploma in Construction and the Built Environment Pearson BTEC International Level 3 Diploma in Civil Engineering Pearson BTEC International Level 3 Extended Diploma in Construction and the Civil Engineering
Unit number and title	**Unit 23: Construction in Civil Engineering**
Learning aim(s) (For NQF only)	**B:** Develop a substructure design for a civil engineering project. **C:** Develop a superstructure design and specification for a civil engineering project.
Assignment title	Civil Engineering Substructures and Superstructures
Assessor	
Issue date	
Hand in deadline	

Vocational Scenario or Context	You have been employed as a trainee site engineer in a local civil engineering section of a large construction company. The team you are working with provides innovative, efficient solutions to civil engineering challenges. The company is involved in a wide range of areas such as roads, railway, water and wastewater, highways, energy and bridges. There is a demand for modern infrastructure, which meets the needs of today's society without affecting future generations.

Task 1	As part of the treatment works it is proposed that a three-storey service building is to be constructed. Your mentor has requested that you produce designs for civil engineering foundations, drainage systems and utility distributions for the building using the information on the ground conditions provided below. (Use sketches and referenced annotated diagrams to illustrate your designs.) Appraise and validate your design for the foundation, drainage installation and utility provision for the three story service building in the given ground conditions. PROJECT Ground conditions in the area of the construction work. The city is built on the flood plain of the main river. In addition to the alluvial deposits, a deposit of soft grey mud, silt and fine sand with numerous seashells underlies the centre of the city. It is over 15m thick in the docks area of the city and 3-10 m in the commercial and inner city areas. This deposit presents engineering problems because of its very low bearing strength. Beneath the post glacial alluvial deposit is over-consolidated boulder clay. This was deposited approximately 100,000

	years ago. The repeated advance of ice sheets, up to 1km thick, has left the Boulder clay, which represents the ground moraine of the ice sheet. The uppermost formation of the Boulder Clay is a 4m to 5m thick stiff to very stiff, brown, slightly sandy clay. Beneath this upper layer is a 10m thick layer of very stiff, dark grey, slightly sandy clay, with some gravel and cobbles. A summary of the soil types and thickness of the strata are detailed below: 0 – 15 m Soft grey mud, silt and fine sand 15 – 20 m thick stiff to very stiff, brown, slightly sandy clay 20 – 30 m very stiff, dark grey, slightly sandy clay, with some gravel and cobbles. The water table is at 0.5 m **To do this:** • research designs for civil engineering foundations for the given ground conditions. • research designs for civil engineering drainage and utilities for the given ground conditions. • Appraise and validate the design for the foundation, drainage installation and utility provision for the three story service building in the given ground conditions **You then need to:** Produce an illustrated technical report that includes designs for civil engineering foundations, drainage systems and utility distributions for the building using the information on the ground conditions. (Use sketches and referenced annotated diagrams to illustrate your designs.) and appraise and validate the design for the foundation, drainage installation and utility provision for the three story service building in the given ground conditions - Consider all the different types of foundation, which could be used for the building. - Consider the different design and use of drainage installations required for the building. - Consider techniques used for the installation of water, electrical, gas and data services for the building. - Select the most suitable designs and appraise and validate your choices.
Task 2	As part of the treatment works it is proposed that a three storey service building is to be constructed. Your mentor has requested that you consider the range of options available and create a suitable specification for the superstructure frame of the building. The site for the proposed building will require clearing and a 5 m retaining wall will need to be built. Your mentor has

	requested that you consider the range of options available for retaining walls and create a drawing and specification for a suitable retaining structure. The soil to be retained by the structure is boulder clay. Analysis and appraise your selected specifications for the superstructure frame and retaining structure. **To do this:** • research steel and concrete-framed buildings, • Research the range of retaining structures available. • Analysis and appraise your selected specifications for the superstructure frame and retaining structure. • **You then need to:** Produce an illustrated technical report that includes a specification for the superstructure frame of the building and a drawing and specification for a suitable retaining structure. The report should also analyse, justify and appraise your selected specifications for the superstructure frame and retaining structure. - Consider the different options for the superstructure frame of the building. - Consider the range of retaining structures available. - Select the most suitable specifications and analysis and appraise them.
Checklist of evidence required	Evidence must include: An illustrated technical report that should include evidence of individual research conducted by the learner for example, images and information on the specification for the superstructure frame of the building and a drawing and specification for a suitable retaining structure. These will be fully annotated and referenced appropriately to support the narrative of the evidence.

Criteria covered by this task:	
Unit/Criteria reference	To achieve the criteria you must show that you are able to:
23/B.D2	Evaluate the design for a foundation, drainage installation and utility provision for given ground conditions.
23/C.D3	Evaluate the specifications produced for the superstructure frame and a retaining structure against design parameters.
23/B.M2	Justify the design produced for a foundation, drainage installation and utility provision for given ground conditions.
23/C.M3	Assess the specifications produced for the superstructure frame and a retaining structure against design parameters.
23/B.P3	Produce designs for civil engineering foundations for given ground conditions.
23/B.P4	Produce designs for civil engineering drainage and utilities for given ground conditions.
23/C.P5	Produce a specification for a superstructure frame that meets design parameters.
23/C.P6	Produce a drawing and specification for a retaining structure that

	meets design parameters.
Sources of information to support you with this Assignment	**Textbooks** S Emmitt and C.A Gorse 2014 “Barry’s Advanced Construction of Buildings” 3rd Edition Published by John Wiley and Sons Ltd ISBN-10: 1856178056 R Greeno 2012 “Advanced Construction Technology” 5th Edition Published by Pearson ISBN 10: 0435046837 **Websites** The Construction Industry knowledge base: https://www.designingbuildings.co.uk Institution of Civil Engineers: https://www.ice.org.uk/ **Above are examples of websites. Further useful resources may be found at** qualifications.pearson.com/en/support/published-resources.html
Other assessment materials attached to this Assignment Brief	*N/A*